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SOURCE Spravochnik Dorozhnogo Masters i Brigidira Puti (Handbook for the Track Foreman and Track Brigade Leader), Moscow, Transzheldorizdat, 1950,
 pp 567-572.

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SOVIET EXPENDITURE NORMS FOR TRACK MAINTENANCE

Table 1. Materials Expenditure Norms for Reconstruction of One Kilometer of Track

Materials and Unit	Rails of 50 Kg/Running Meter		Rails of 43.6 Kg/Running Meter	
	R < 650*	R > 650 and Straight**	R < 650*	R > 650 and Straight**
Rails				
Pieces	160	160	160	160
Tons	101.0	101.0	87.2	87.2
Joint bars				
Pieces	320	320	320	320
Tons	4.53	4.53	6.27	6.27
Tie plates				
Pieces	4,000	3,680	4,000	3,680
Tons	26.2	24.1	19.9	18.2
Bolts				
Pieces	640	640	960	960
Tons	0.50	0.50	0.54	0.54
Spikes				
Pieces	20,000	18,400	12,000	11,040
Tons	7.5	6.9	4.50	4.14
Washers				
Pieces	640	640	960	960
Tons	0.05	0.05	0.036	0.035

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Table 1 (Contd)

Materials and Unit	Rails of 50 Kg/Running Meter		Rails of 43.6 Kg/Running Meter	
	R < 650*	R > 650 and Straight**	R < 650*	R > 650 and Straight**
Impregnated ties Pieces	2,000	1,840	2,000	1,840
Ballast				
Sand (cu m)	300	300	300	300
Crushed rock or gravel of 3 to 40 mm (cu m)	1,570	1,570	1,570	1,570
Anticreepers				
Spring type				
Pieces	1,920	1,920	1,920	1,920
Tons	2.50	2.50	1.92	1.92
Wedge type				
Pieces	480	480	480	480
Tons	2.4	2.4	2.16	2.16

NOTE: When calculating materials requirements, add per-kilometer reserves shown in Table 8.

* R < 650 indicates minimum curvature radius of less than 650 meters.

** R > 650 indicates minimum curvature radius of greater than 650 meters.

Table 2. Materials Expenditure Norms per Kilometer
of Capital Repair of Track Laid on Sand Ballast

Materials and Unit	Rails of 50 Kg/Running Meter			Rails of 43.6 Kg/Running Meter		
	Ties			Ties		
	1,440	1,600	1,840	1,440	1,600	1,840
Rails						
Pieces	--	160	--	--	160	--
Tons	--	101.0	--	--	87.2	--
Joint bars						
Pieces	--	320	--	--	320	--
Tons	--	4.53	--	--	6.27	--
Tie plates						
Pieces	2,880	3,200	3,680	2,800	3,200	3,680
Tons	18.86	20.96	24.10	14.25	15.84	18.2
Bolts						
Pieces	--	640	--	--	960	--
Tons	--	0.50	--	--	0.54	--
Spikes						
Pieces	14,400	16,000	18,400	8,640	9,600	11,040
Tons	5.4	6.0	6.9	3.24	3.60	4.14

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Table 2 (Contd.)

Materials and Unit	Rails of 50 Kg/Running Meter			Rails of 43.6 Kg/Running Meter		
	Ties			Ties		
	1,440	1,600	1,840	1,440	1,600	1,840
Washers						
Pieces	--	640	--	--	960	--
Tons	--	0.05	--	--	0.036	--
Ties						
Pieces	495	551	634	495	551	634
Sand ballast (cu m)	--	950*	--	--	950*	--
Anticreeper						
Spring type						
Pieces	--	1,920	--	--	1,920	--
Tons	--	2.50	--	--	1.92	--
Wedge type						
Pieces	--	400	--	--	400	--
Tons	--	2.0	--	--	1.8	--

NOTE: When calculating materials requirements, add per-kilometer reserves shown in Table 8.

* When using crushed-rock ballast 800, and in the capital repair of track when replacing sand ballast with crushed rock or gravel, it is necessary to use 1,200 cubic meters of crushed rock and 200 cubic meters of sand.

Table 3. Materials Expenditure Norms per Kilometer of Medium Repair of Track and Reinforcement of Curves

Materials and Unit	With 1,440 Ties per Km	With 1,600 Ties per Km	With 1,840 Ties per Km
Old rails of all types			
Pieces	9	9	9
Joint bars for Types I-u and II-a rails			
Pieces	68	68	68
Tons	1.33	1.33	1.33
Joint bars for Type III-a rails			
Pieces	68	68	68
Tons	0.96	0.96	0.96
Joint bars for rails lighter than Type III-a			
Pieces	68	68	68
Tons	0.96	0.69	0.69
Tie plates for Types I-u and II-a rails			
Pieces	113	135	167
Tons	0.56	0.67	0.83

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Table 3 (Contd.)

<u>Materials and Unit</u>	<u>With 1,440 Ties per Km</u>	<u>With 1,600 Ties per Km</u>	<u>With 1,840 Ties per Km</u>
Bolts			
Pieces	189	189	189
Tons	0.105	0.105	0.105
Spikes			
Pieces	1,348	1,518	1,774
Tons	0.50	0.569	0.660
Washers			
Pieces	491	491	491
Tons	0.018	0.018	0.018
Ties			
Pieces	414	460	529
Sand ballast (cu m)	300-750	300-750	300-750
Crushed rock ballast (cu m)	166	166	166
Anticreepers			
Wedge type			
Pieces	171	171	171

NOTE: When using crushed-rock ballast it is necessary to reduce the norms for expenditure of materials 10 to 30 percent.

Table 4. Materials Expenditure Norms for Replacing One Kilometer of Track With New Rails

<u>Materials and Unit</u>	<u>Rails of 50 Kg/Running Meter</u>			<u>Rails of 50 Kg/Running Meter</u>		
	<u>Tie.</u>			<u>Ties</u>		
	<u>1,440</u>	<u>1,600</u>	<u>1,840</u>	<u>1,440</u>	<u>1,600</u>	<u>1,840</u>
Rails						
Pieces	--	160	--	--	160	--
Tons	--	101.0	--	--	87.2	--
Joint bars						
Pieces	--	320	--	--	320	--
Tons	--	4.53	--	--	6.27	--
Tie plates						
Pieces	2,880	3,200	3,680	2,880	3,200	3,680
Tons	18.86	20.96	24.10	14.25	15.84	18.2
Bolts						
Pieces	--	640	--	--	960	--
Tons	--	0.50	--	--	0.54	--
Spikes						
Pieces	14,400	16,000	18,400	8,640	9,600	11,040
Tons	5.4	6.0	6.9	3.24	3.60	4.14

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Table 4 (Contd)

Materials and Unit	Rails of 50 Kg/Running Meter			Rails of 50 Kg/Running Meter		
	Ties			Ties		
	1,440	1,600	1,840	1,440	1,600	1,840
Washers						
Pieces	--	640	--	--	960	--
Tons	--	0.05	--	--	0.036	--
Anticreepers						
Spring type						
Pieces	--	1,920	--	--	1,920	--
Tons	--	2.50	--	--	1.92	--
Wedge type						
Pieces	--	400	--	--	400	--
Tons	--	2.0	--	--	1.8	--

Table 5. Materials Expenditure Norms for Replacing One Kilometer of Track With Old Rails

Materials and Unit	Rail, Types I-a, II-a and I-u			Rail, Type III-a		
	Ties			Ties		
	1,440	1,600	1,840	1,440	1,600	1,840
Old rails (km)	--	1.0	--	--	1.0	--
New joint bars						
Pieces	--	31	--	--	31	--
Tons	--	0.61	--	--	0.44	--
New tie plates						
Pieces	310	351	415	310	351	415
Tons	1.53	1.74	2.05	0.95	1.07	1.27
New bolts						
Pieces	--	176	--	--	176	--
Tons	--	0.10	--	--	0.10	--
New spikes						
Pieces	1,722	1,934	2,252	1,722	1,234	2,252
Tons	0.65	0.73	0.84	0.65	0.73	0.84
New washers						
Pieces	--	491	--	--	491	--
Tons	--	0.018	--	--	0.018	--
Anticreepers						
New spring type						
Pieces	--	171	--	--	171	--

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Table 6. Expenditure Norms of Superstructure Materials
for the Installation of One New Switch

<u>Materials and Unit</u>	<u>Switch of Type I-u Rail</u> <u>(43.6 kg/running meter)</u>	
	<u>Switch Type 1-in-11</u>	<u>Switch Type 1-in-9</u>
New rail, Type I-u (km)	0.08	0.07
New joint bars		
Pieces	32	32
Tons	0.63	0.63
New tie plates		
Pieces	168	142
Tons	0.83	0.70
New bolts		
Pieces	96	96
Tons	0.55	0.055
New spikes		
Pieces	504	420
Tons	0.19	0.16
New washers		
Pieces	96	96
Tons	0.004	0.004

Table 7. Norms for Materials Reserves per Kilometer
for Reconstruction, Capital Repair of Track,
or Replacing Old Rails With New

<u>Materials and Unit</u>	
Rails of 50 kg/running meter	2
Pieces	1.27
Tons	
Rails of 43.6 kg/running meter	2
Pieces	1.1
Tons	
Joint bars for rail of 50 kg/running meter	8
Pieces	0.12
Tons	
Joint bars for rail of 43.6 kg/running meter	8
Pieces	0.16
Tons	
Tie plates for rail of 50 kg/running meter	2
Pieces	0.013
Tons	
Tie plates for rail of 43.6 kg/running meter	2
Pieces	0.010
Tons	

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Table 7 (Contd)

Materials and Unit

Bolts for rail of 50 kg/running meter	8
Pieces	0.006
Tons	
Bolts for rail of 43.6 kg/running meter	8
Pieces	0.004
Tons	
Spikes	50
Pieces	0.019
Tons	
Washers for rail of 50 kg/running meter	8
Pieces	0.00062
Tons	
Washers for rail of 43.6 kg/running meter	8
Pieces	0.0004
Tons	
Spring type anticreepers for rail of 50 kg/running meter	20
Pieces	0.017
Tons	
Anticreepers for rail of 43.6 kg/running meter	20
Pieces	0.015
Tons	
Wedge type anticreepers for rail of 50 kg/running meter	2
Pieces	0.010
Tons	
Wedge type anticreepers for rail of 43.6 kg/running meter	2
Pieces	0.009
Tons	

Table 8. Network-Wide Norms for Expenditure
of Superstructure Materials in Maintenance of Tracks

<u>Materials and Unit</u>	<u>Norm for replacing One Km of Main Tracks</u>			<u>Norm for One Km of Station Tracks</u>
	<u>Ties</u>	<u>Ties</u>	<u>Ties</u>	
	1,440	1,600	1,840	
Ties				66
Pieces	118	131	151	
Sand ballast (cu m)	--	58	--	29
Crushed rock ballast (cu m)	--	11	--	--
Joint bars				15
Pieces	--	29	--	0.21
Tons	--	0.57	--	

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Table 8 (Contd)

<u>Materials and Unit</u>	<u>Norm for Replacing One Km of Main Tracks</u>			<u>Norm for One Km of Station Tracks</u>
	<u>1,440</u>	<u>1,600</u>	<u>1,840</u>	
Tie plates				
Pieces	--	12	26	6
Tons	--	0.06	0.13	0.02
Bolts				
Pieces	--	60	--	30
Tons	--	0.033	--	0.016
Spikes				
Pieces	438	507	622	254
Tons	0.16	0.19	0.23	0.085
Washers				
Pieces	--	77	--	38
Tons	--	0.003	--	0.002
Anticreepers				
Wedge type				
Pieces	--	40	--	20
Old rails				
Pieces	--	6	--	3

NOTE: Norm for materials per kilometer with crushed rock ballast should be reduced 10-30 percent.

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